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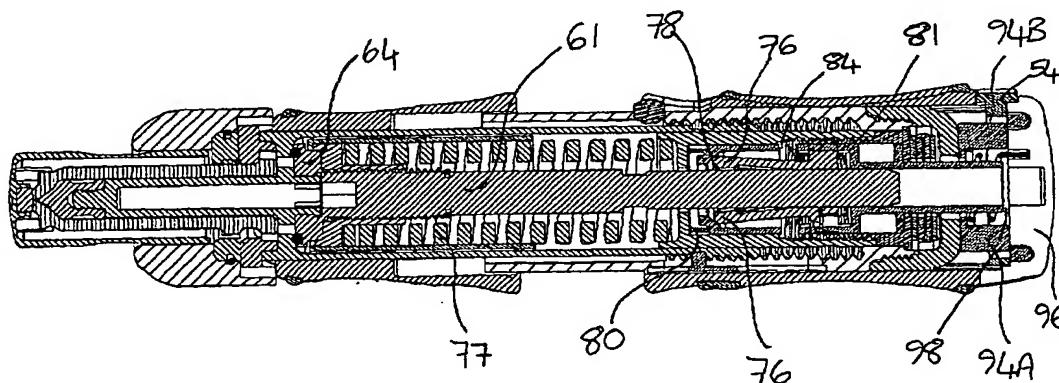
— with international search report

(88) Date of publication of the international search report:

10 September 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **NEEDLELESS INJECTION DEVICE**



(57) Abstract: A needleless injection device comprising a discharge assembly with a retention member fixed in the assembly, said retention member having a plurality of retention elements (76, 76A) spaced around and adapted to locate on a ram (61) to drive a piston into a cylinder for medicament when in a charged position of the ram, and a release ring (78) surrounding said retention elements to prevent radial outward displacement thereof and discharge of the ram; and wherein axial displacement of said release ring (78) releases said retention elements and causes discharge of the ram. The retention elements are integral with said retention member and each has an enlarged head which can move into and out of engagement with a groove or recess on the ram by deformation of the material of said retention member.

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WO 2004/037328 A3

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/04532

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61M5/30 A61M5/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/47746 A (AAMARK MIKAEL ;BERGENS THOMAS (SE); SHL MEDICAL AB (SE)) 20 June 2002 (2002-06-20) page 8, line 17 -page 9, line 26; figures 1,7,9	1-7, 13, 22
P, X	WO 03/070296 A (LESCH PAUL R JR ;ANTARES PHARMA INC (US)) 28 August 2003 (2003-08-28) page 2, line 16-19 page 10, line 8-18	1-7, 13, 22
A	US 2001/039394 A1 (WESTON TERENCE EDWARD) 8 November 2001 (2001-11-08) figures 9A,B	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

3 June 2004

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15. 06. 2004

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/04532

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 993 309 A (EXPRESS INJECTOR COMPANY LTD) 26 May 1965 (1965-05-26) page 3, line 75-91 ----	14-18
P,A	EP 1 291 028 A (AVANT DRUG DELIVERY SYSTEMS IN) 12 March 2003 (2003-03-12) paragraph '0027!; figure 6 ----	14-18
A	US 5 782 802 A (LANDAU SERGIO) 21 July 1998 (1998-07-21) column 6, line 65 -column 7, line 55; figures 1-4 ----	8-12
A	US 6 383 168 B1 (BONICATTO JAMES M ET AL) 7 May 2002 (2002-05-07) column 4, line 67 -column 5, line 9; figure 3 ----	8
A	US 5 875 976 A (STOECKMANN WALTER ET AL) 2 March 1999 (1999-03-02) column 5, line 33-49; figure 1 -----	8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/04532

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0247746	A	20-06-2002	SE 518981 C2 AU 2287202 A CA 2431774 A1 EP 1349590 A1 SE 0004628 A WO 0247746 A1 US 2004039336 A1	17-12-2002 24-06-2002 20-06-2002 08-10-2003 15-06-2002 20-06-2002 26-02-2004
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/04532

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5875976	A	TW 391882 B WO 9830253 A2	01-06-2000 16-07-1998

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 03/04532

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 21
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1-18, 22
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 21

Claim 21 seeks to define subject-matter by reference to "any appropriate combination of the drawings". This definition is so unclear (Article 6 PCT and Rule 6.2(a) PCT) that no meaningful search is possible. It is impossible to imagine the scope of protection sought by the applicant. Therefore, no search has been carried out for claim 21.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-7, 13-18, 22

Claims 1-7, 13-18 and 22 essentially define a needleless injection device comprising

- 1) a medicament cylinder with a sliding piston therein,
- 2) a ram to drive the piston and an energy accumulator to drive the ram,
- 3) the rear end of the ram extending into a discharge assembly,
- 4) the discharge assembly having a retention member having a plurality of retention elements radial displacement of which is prevented by a release ring to prevent discharge of the ram, and
- 5) the retention elements being integral with the retention member, and each having an enlarged head which can move into and out of engagement with a groove on the ram by deformation of the material of the retention member, wherein
- 6) the retention member comprises a collet with radially spreadable fingers and the release ring having a collet lock sleeve which limits outward radial movement of the collet fingers (cf. claims 2-4).

2. Claims: 8-12

Claims 8-12 essentially define a needleless injection device comprising

- 1) a medicament cylinder with a sliding piston therein,
- 2) a ram to drive the piston and an energy accumulator to drive the ram,
- 3) the rear end of the ram extending into a discharge assembly,
- 4) the discharge assembly having a retention member having a plurality of retention elements radial displacement of which is prevented by a release ring to prevent discharge of the ram, and
- 5) the retention elements being integral with the retention member, and each having an enlarged head which can move into and out of engagement with a groove on the ram by deformation of the material of the retention member, with further
- 6) the device comprising a nozzle-lock assembly (claim 8).

3. Claims: 19, 20

Claims 19 and 20 essentially define a needleless injection device comprising

- 1) a medicament cylinder with a sliding piston therein,
- 2) a ram to drive the piston and an energy accumulator to drive the ram,
- 3) the rear end of the ram extending into a discharge

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

assembly,

4) the discharge assembly having a retention member having a plurality of retention elements radial displacement of which is prevented by a release ring to prevent discharge of the ram, and

5) the retention elements being integral with the retention member, and each having an enlarged head which can move into and out of engagement with a groove on the ram by deformation of the material of the retention member, and

6) the energy accumulator being a spring in a variable volume chamber (claim 19).